

Generalized Interpolation with Applications

Holger Wendland

University of Göttingen / Technical University of Dresden

A generalized interpolation problem can be described as follows. Let H be a Hilbert space of real-valued functions f defined on some domain Ω and let H^* be the dual of H . Given N linearly independent functionals $\lambda_1, \dots, \lambda_N \in H^*$ and N values f_1, \dots, f_N , one seeks for a function s from a subspace \mathcal{F} of H that satisfies $\lambda_j(s) = f_j$ for all j . The simplest situation is given by interpolation, where the functionals are point evaluations. But also collocation and Galerkin methods can be expressed in terms of generalized interpolation. Moreover, pure interpolation can be enriched by additional constraints.

In this talk, after a short introduction to generalized interpolation, I will concentrate on the following three topics:

- Error estimates for scattered data interpolation.
- Applications from surface reconstruction and fluid-structure-interaction, using generalized interpolation to recover rotations.
- Vortex methods: A possible application of divergence-free radial basis functions.